

and sometimes at an angle. In a moist neighbourhood the eggs are not so far from the surface as they are in the drier sandy soil.

The young when hatched are well feathered and can fly, and at once commence an independent existence, as they do not stay with their parents. Scrub-fowls are difficult to keep in confinement, being very restless, and generally end by accidentally killing themselves. Consequently adult birds of this species are rarely seen in captivity.

IV.—*On the Comparative Ages to which Birds live.*

By J. H. GURNEY, F.Z.S.

How many things there are in ornithology, in spite of our boasted proficiency at the present day, of which we are really profoundly ignorant! And one of these is the age of birds. Who can say what guides birds on migration, in spite of all which has been written on the subject—whether any of them have the power of smelling—what their powers of vision are, or even what becomes of them when they are dead?

There is still much difference of opinion as to whether many species moult the major part of their plumage or recolour, and the best ornithologists are divided as to the height at which birds migrate, the speed at which they go, and the age to which they can, under the most favourable conditions, live, which is the subject of the present paper. No one, up to now, has been at the pains to collect and compare the facts about age scattered in many books, but I hope to make at least a step in that direction. Birds are not to be compared to human beings. They are in truth handicapped in the race for life, for it is ordained that all the feathered tribes should be very much exposed to death from a great many accidental causes. We may so call death from insufficiency of food (oftenest arising from the extremes of heat and frost), from ravenous Hawks and other predaceous animals, and from the hand of man with his gun and snare. Almost every species of bird migrates, and they have to reckon on storms during

migration, which doubtless dash them into the sea in hundreds every year.

Because of these perils, it may well be believed that not one bird in fifty reaches its full possible duration of life, perhaps not one in two hundred. However, the subject for discussion in this article is not the average age to which birds commonly live, but rather the full extent of age to which they can live, all things being in their favour; but both divisions of the subject are interesting, and I am surprised that no recent writer has inquired into them.

The great Lord Bacon (b. 1561), in his treatise on ‘Length and Shortness of Life in Living Creatures,’ had a great deal to say about the age of birds, and concluded that more kinds were found to be long-lived than of beasts, setting forth various reasons why this was probably so. He particularly lays emphasis on the mixed motion of birds in their flying, as being a kind of exercise conducive to longevity, which is denied to beasts, and he assigns to several sorts what was believed to be the maximum of their longevity in his day, and really we do not know much more about it now than he did then.

Willughby and Ray (1676) devote a chapter to “The Age of Birds,” which shows that attention had been turned to the subject by older authors than themselves, like Aldrovandus. Something also may be found in *Philos. of N. H.* ii. p. 416, and in ‘Domestic Habits of Birds,’ 1833, from the pen, I believe, of Prof. J. Rennie; but the literature of the subject in modern times is very scanty, though a certain number of incidental notices are scattered about such journals as ‘The Field’ newspaper and ‘The Zoologist.’

In Thompson’s ‘Birds of Ireland’ (1851) there is a useful article, and in ‘The Naturalist’ for 1897, p. 129, there is a paper by Mr. Oxley Grabham on “Owls and their Longevity.” Allusion should also be made to Mr. W. B. Tegetmeier’s article on “Length of Life in Zoological Collections” (‘The Field,’ June 5th, 1869), and to some notes in the late Lord Lilford’s two articles on “Raptorial Birds in the Lilford Aviaries,” *Norwich N. Trans.* iv. p. 564, v. p. 128.

Again, in Knapp's 'Journal of a Naturalist,' the duration of animal life is discussed at p. 180. Remarking on the longevity of the Eagle, Raven, and Parrot in a captive condition, the author opines that "in a really wild state they would expire before the period which they attain when under our attention and care;" and again he says "it is probable that few animals in a perfectly wild state live to a natural extinction of life."

It is easier to subscribe to the second opinion here expressed than to the first. Cage-birds are too often neglected to have an easy time of it, but perhaps a semi-domesticated bird like *Cygnus olor* has the best chance of longevity of any.

It is more than probable that some families, and it may be even allied genera, attain a greater age than others, and to elicit information on this head has been one object of inquiry. The tenacity of life in *Sarcorhamphus gryphus* and *Gyps fulvus* is great, and all Eagles and carrion-eating birds are reputed to exist a long time without food; a neglected *Aquila chrysaëtus*, for example, lived 21 days.

Some of the sea-birds can fast a very long time, such as *Puffinus anglorum*. A *Somateria mollissima* of Mr. St. Quintin's had no food for 28 days, and a *Diomedea nigripes* of Mr. Robert Swinhoe's none for 35. The young of *Diomedea* has been thought to live on its own fat, and it is said that *Aptenodytes demersa* can live two months without a morsel of food (Ibis, 1866, p. 324). These facts are suggestive, for surely all such famine-proof birds must in the race for life have an advantage over the weaker *Passeres* and *Picariæ*. Grass-Finches, Manikins, Waxbills, Cut-throats, &c., whatever may be the case in Africa, can last a very short time without seed in confinement here in England. The *Columbæ* and the *Tetraonidæ* and *Phasianidæ* also contain genera which seem to want food often, even in a wild state.

The following is a selection of genera for comparison, indicative of their normal length of life, from the list of ages to be presently given:—

	Years.
Cockatoo (<i>Cacatua</i>)	81
Goose (<i>Anser</i>)	80
Swan (<i>Cygnus</i>)	70
Raven (<i>Corvus</i>)	69
Owl (<i>Bubo</i>)	68
Macaw (<i>Ara</i>)	64
Heron (<i>Ardea</i>)	60
Bateleur Eagle (<i>Helotarsus</i>)	55
Vasa Parrot (<i>Coracopsis</i>)	54
Condor (<i>Sarcorhamphus</i>)	52
Albatross (<i>Diomedea</i>)	46
Gull (<i>Larus</i>)	44
Pelican (<i>Pelecanus</i>)	41
Dove (<i>Turtur</i>)	40
Oyster-catcher (<i>Hæmatopus</i>)	30
Emu (<i>Dromæus</i>)	28

Dr. Brehm thought that the smaller birds had a shorter life than the larger ones, and some other naturalists have taken up the same idea, which is not improbable; but it is a theory which is mere supposition, and one which is almost incapable of proof, and I only mention it as having Brehm's authority. I may here quote some remarks from a correspondent who has felt the same interest in this difficult matter that I have. "One of the puzzles," writes Mr. R. M. Barrington *in litt.*, "of the ornithological census is the uniformity with which birds maintain their numbers. The Guillemot with one egg does not diminish, and the Wren and Teal do not seem to increase, although laying many more eggs. The mortality seems in direct ratio to the birthrate It would seem that, broadly speaking, a bird which lays one egg must live longer than a bird which lays ten, if they both breed once annually."

Whether "age" is or is not the solution of this puzzle is a difficult question to answer,—there is no species of Duck in my list older than 29, and as to Wrens and Guillemots we know nothing. The Guillemot has probably few enemies, and the Wren and Long-tailed Titmouse cannot have much to contend with. It looks as if Mr. Barrington's suggestion was right, yet it must be remembered that there are several

sorts of birds that lay a good many eggs, such as the *Anseres* and *Cygni*, which are known to be long-lived.

Weismann and Oken have argued that in St. Kilda [Boreray] so many young Gannets (*Sula bassana*) are annually taken for food that, if this were not a long-lived species, diminution in the stock would be observable; and the same applies to the Fulmar (*Fulmarus glacialis*). This is in some respects rather a false style of reasoning, because if there were not an annual slaughter there would probably be an annual throwing off of the surplus; but as the argument has been put forward it must not be passed over. If it were admitted, it would apply in a less degree to *Perdix cinerea* and *Lagopus scoticus*, which are shot by tens of thousands, and also to several other birds.

Search as we will, we hardly ever find a bird which has unmistakably died a natural death, and this has been put forward by some authors as a great argument for longevity. For the same reason great age has been assigned to the elephant, and such elephant-hunters as Sir Samuel Baker and Col. Pollock declare that they have never come across the carcass of an elephant. Allowing for the quick consumption of the soft parts by predaceous quadrupeds and burying beetles, one would at least expect to find the larger birds' skeletons occasionally, but such is very seldom the case.

The period of a bird's incubation seems to have something to do with the length of its life, albeit the *Psittaci* are the principal exception which invalidate this theory. Referring to Mr. William Evans's "Table of Periods of Incubation" (*Ibis*, 1891, p. 57, 1892, p. 55), it will be seen that Cockatoos take 21 days, Cockateels 20, Parrakeets 18, and Macaws from 20 to 25, to hatch. Three weeks is very little for such a long-lived family as this is commonly supposed to be, compared with the incubation of many birds which, according to our present knowledge, do not live so long as the *Psittaci*; but the subject cannot be worked out without more facts which we have not got at present. Among long-lived birds which take a long time in incubation, the principal are:—

<i>Bubo maximus</i> ,	about 35 days (<i>Gurney</i>).
<i>Aquila</i> ,	30-35 days (<i>Evans</i>).
<i>Sarcorhamphus</i> ,	54 days (<i>Broderip</i>).
<i>Anser domesticus</i> ,	30 days (<i>Evans</i>).
<i>Cygnus olor</i> ,	36 days (<i>Stevenson</i>).

So far as they go these support the theory, but unfortunately there are also many exceptions to invalidate it. To take only one: a domesticated Wild Duck requires 28 days to hatch her eggs, and the domesticated Muscovy Duck 37 days; but one lives as long as the other so far as we know, though poultry-keepers do not commonly give any Ducks the chance of very great longevity*.

It is abundantly proved that so long as health remains to them the majority of birds can go on breeding, as Mr. Meade-Waldo's Eagle-Owls, to be mentioned presently, testify. It is so with the domestic Goose of our farmyards. Mr. L. Wright says:—"The Goose lives, lays, and produces strong and healthy progeny to a very advanced age, many cases being recorded of birds being in full breeding to at least forty years old." ('The Book of Poultry,' p. 560). What is true of *Anser domesticus* and *Bubo maximus* is also true of many other birds. Their vocal powers are likewise known to remain strong and vigorous for a very long period: a Blackbird of 20 continued to sing well ('The Belfast Commercial Chronicle,' Dec. 25th, 1839) and a Skylark nearly as long ('Zoologist,' 1865, p. 9604), while a *Gymnorhina tibicen* of 26 was noisy to the last. If birds can sing as long as that in a cage, there is probably no limit in a wild state. Johann Naumann instances a Cuckoo which called, season after

* It is generally held by those best qualified to judge (though not by Prof. Newton) that there is also some correspondence between age and gestation in mammals, at any rate in the larger Mammalia. The subject has lately been revived and ventilated in 'The Field' newspaper (see February 5th and 12th, 1898), and some facts and some theories put forward about elephants by Col. Pollock and Mr. Cameron. The idea is as old as Pliny, commenting on whom Willughby and Ray remark: "If Animals of different kinds be compared together, as for example Birds with Beasts, those will sometimes be found to be most vivacious [long-lived] which are borne the least while in the womb."

season, in the same peculiar key for 25 years, and was considered to be the same bird, and other cases in point might be cited.

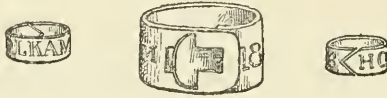
Bleached or faded birds, and birds with worn or abraded plumage, are often held on that account to be very old, but the truth is the colouring of a bird in perfect health and the texture of its feathers are exactly the same at 50 as at five,—*vide* Mr. Meade-Waldo's veteran pair of *Bubo maximus*. Neither are overgrown beaks and misshaped claws a sign of age, arising in all cases from unnatural conditions of some kind. An *Alauda arvensis* of 20 with a hind claw exceeding $2\frac{1}{2}$ inches did not owe that deformity, as its owner erroneously supposes, to its age, but to captivity and unnatural perches.

Sometimes birds, after being many years in captivity, have been known to develop white feathers, e. g. *Turdus merula* (Thompson), *Monticola cyanus* (Macpherson), *Fringilla cœlebs* (Butler). But this incipient albinism is not directly due to age, but to the artificial conditions under which all birds are placed in captivity. In the same way, when the colour of the iris grows pale, as in nocturnal and diurnal birds of prey, it is much more likely to be from sun-exposure than from age, though it is possibly longevity which sometimes produces blindness from cataract in *Bubo maximus* and some *Psittaci*.

Now I should like to say a word about marking birds, which some experimenters have thought could be made an available method if placed in careful hands, and it certainly seems that it might be so. Nevertheless, artificial marking to test age is a procedure beset with difficulties, for the chances must ever be 50 to 1 against a ringed wild bird turning up in the right quarter to be identified after a lapse of years. The easiest species to experiment with would probably be *Cygnus olor*, living as it does in a semi-domesticated state, and *C. olor* has had, ever since the swanherds of the time of Bacon, the reputation of antiquity. *Ardea cinerea* has on various occasions been ringed by the Loo Hawking Club and other falconers, as will appear further on, and there is one

very curious anecdote of a Dutch Swan which bore its ring 102 years.

The lightest aluminium rings are recommended by some pigeon-fanciers, as they do not rust, to be fixed close round the leg (tarsus), but they are not so pliable as white metal rings, which can be made of all sizes, open easily, and are said not to corrode. Either sort can be obtained from Mr. A. C. Hughes, Fulwell Station, Twickenham, the inventor of interlocking rings, such as are shown in the accompanying figures. If used for young birds, the day of putting them on should be deferred as long as possible, for in most cases the tarsus continues to grow until the bird is full-grown, and cruelty may arise from too tight a ligature.



Interlocking rings for marking birds.

Since 1891 about nine young Woodcocks have been annually ringed at Alnwick Castle in Northumberland, as I learn from Mr. E. G. Wheeler, who adds that the practice of ringing them will be continued by the Duke's orders. If they are not all shot, we may anticipate that naturalists will get some statistics from some of these "Longbills," but some have been killed already in the Alnwick preserves, besides one in Kent and another in Ireland. There is at present no case of a Woodcock living more than $6\frac{1}{2}$ years.

In 1896 nineteen *Uria bruennichi* and twenty-two *Rissa tridactyla*, were liberated in Franz Josef Land marked with a "J" (Ibis, 1898, pp. 268, 271). In 1898 Col. Feilden had some birds ringed at Holkham in Norfolk with rings stamped "Holkham 1898"; and Miss Hamond ringed 44 young *Sterna fluviatilis* at the same place with rings inscribed "1898," and one of them has turned up already. In 1887 a marked Albatross was released off Cape Horn.

In the case of the *Alcidæ* daubs of paint have been tried,

but artificial marks are of no value as an indication of age, for the feathers of birds are continually dropping out and wearing away. For this reason accidental varieties, *e. g.* the pied Ravens of Faeroe, cannot be trusted for many years. A white-headed *Turdus merula* seen at Fethard for 15 years ('Birds of Ireland,' i. p. 148) and another, seen at Barnard Castle for 7 (Zool. 1866, p. 347), may or may not have been the identical individuals which first revealed themselves, as their recorders believed them to be.

The following, by Mr. Joseph Whitaker, is very much to the point, and may be adduced as bearing on this fallacy:— "When once a variety has occurred there is always the chance of its coming out again. For instance, in a rookery in Leicestershire a few years back a white Rook (*Corvus frugilegus*) was hatched, and nearly every year since either white or pied ones have occurred." (Norwich N. Tr. iv. p. 63.) These latter were, presumably, the descendants of the albino or of the albino's parents and it is evident that the first white Rook detected may very soon have been dead.

Still less is the fact that a *Gypaëtus barbatus* in Switzerland or a *Corvus corax* frequented one secure precipice for a quarter of a century, without any others of the same species being seen, a proof that it was always the same individual. Neither can we admit as more than presumptive evidence the return year after year of such a bird as the *Muscicapa grisola* to the same nesting-place. To show how unsafe this conclusion would be, Hawfinches (*Coccothraustes vulgaris*) nested almost every year on a certain bough on an apple-tree in Norfolk, though both the old birds were frequently shot (F. Norgate, Norw. Nat. Tr. ii. p. 201), and therefore they could not have been the same.

In the same category is the evidence of the keeper of the Bass Rock who "recognized from particular and well-known marks certain" Gannets for upwards of forty years. (Selby, Brit. Orn. ii. p. 457.)

There are eight Orders of Birds about which I should like to say something before beginning my List.

PASSERES.

In the order *Passeres*, 24 years seems to be about the maximum in confinement, and only five in the list reach that, but six others get as far as 20. Several have lived long enough to refute Brehm's opinion that the smaller singing-birds can scarcely live more than ten years. Mr. Meade-Waldo's pair of *Erythrospiza githaginea* even produced and reared 22 young ones in one season when they were twelve years old, an instance of what skill and care can do with cage-birds in a country far colder than their own. As to how long the *Passeres* can live in a wild state we are quite in the dark, and must remain so apparently, none of those in my list being wild ones.

Dr. A. G. Butler has succeeded in keeping the following Weaver-birds for about nine years:—*Foudia madagascariensis*, *Nesacanthis eminentissima*, *Quelea russi*, *Q. quelea*, *Pyromelana franciscana*, and *P. afra*, and they were all two or three years old when he first had them. Many other small cage-birds have also been kept for about the same period by Dr. Butler and other bird-fanciers. The Raven's attribute of long life dates to early times and has given rise to some amusing stories. On the Faeroe Islands is an old saying:—"A human being lives as long as three horses, a Crow as long as three human beings, but a Raven as long as seven Crows." Willughby says their reported age exceeds all belief, "yet," he adds, "doth it evince that these birds are very long-lived"—having, it may be, in his mind the Greek poet Hesiod, who averred that a Raven would live nine times as long as a man. But neither Francis Willughby nor Bacon nor Kjærbølling, who says "Ravens in confinement have lived over 100 years," gives verified cases. Montbeillard is one who says it seems well ascertained that Ravens sometimes live a century or more, adding that in many cities of France they have been known to attain to that age: probably an assumption from the circumstance of a pair of them, presumably the same individuals, continuing to haunt one rock or one eyrie for an indefinite number of years, which is absolutely no proof.

PSITTACI.

Le Vaillant's oft-quoted anecdote of a Grey Parrot, *Psittacus erithacus*, which began to lose its memory at 60, to moult irregularly at 65, and to become blind at 90, and died at 93 (Hist. Nat. des Perroquets) may be quite true, but is hardly sufficiently established to be in an authenticated list. These familiar pets have repeatedly lived to be five-and-twenty and sometimes thirty, though the stock now commonly imported are so unhealthy that they die in two years. James Jennings refers to one of seventy-seven: he does not say it was *Psittacus erithacus* ('Ornithologia,' p. 396), but probably such was the case.

In 'The Field' of April 10th and 24th, 1869, Mr. J. Jones and "W. H. M." wrote of a Cockatoo of 70, and still alive, which announcement immediately evoked a Scotch Parrot of 72 (*l. c.* May 8th), but in neither case is the name of the species given—probably *Cacatua galerita* and *Psittacus erithacus* are intended.

The *Cacatuidæ* are indubitably long-lived, especially the familiar Sulphur-crested Cockatoo, which, chained to its stand year after year, never seems to get older, and I have two other credible records of this bird at 81 and 50. But if the members of a certain family at Leckhampton, in Gloucestershire, are to be trusted, a Cockatoo once lived 120 years ('Land and Water,' 1870). The old sexton of Leckhampton, whose veracity was supposed to be unimpeachable, told Mr. E. L. Layard he had himself known it "nigh 80 year," and Mr. Layard was not the man to accept such a story without enquiry.

Mr. Abrahams, the well-known dealer, communicated to Dr. A. G. Butler particulars of a Surinam Amazon credibly believed by him to be 102 years old. An Amazon Parrot well known to Dr. W. T. Greene was more than half this age. The Black Vasa (*Coracopsis*) of Madagascar has in three or four instances lived to a good old maturity, one in the Zoological Gardens, vouched for by Mr. Sclater*,

* P. Z. S. 1884, p. 562.

having been there 54 years. In spite of all these instances there is no real proof that the *Psittaci* live longer than other birds; the only thing they really do prove is that Parrots are easier to keep in confinement.

STRIGES.

Certainly Eagle-Owls (*Bubo maximus*) are Methuselahs, as is befitting birds of such a wise and patriarchal countenance. Their longevity has been abundantly demonstrated by many kept by my late father, Lord Lilford, and Mr. Fountaine, but above all by Mr. Meade-Waldo's marvellous old pair, now 68 and 53 years old. What is very remarkable and an extraordinary proof of vigour is that Mr. Meade-Waldo's Owls have bred regularly since 1864, namely 32 years, having in that time reared no less than 93 young ones. They are still in the best of health, showing what care and personal attention can do. It is, I imagine, Mr. Meade-Waldo's old female which has been by mistake alluded to as belonging to the late Lord Lilford by the authors of 'British Birds,' iii. p. 86. But old as Mr. Meade-Waldo's Owls are, Sussex can take the prize, according to the 'West Sussex Gazette,' with one of the hoary denizens of the keep of Arundel Castle, called "Lord Thurlow." This was the name of an Eagle-Owl, the subject of some amusing stories, which expired in 1859 at the age of 100, leaving seven birds in captivity in the "keep," one of which was 63. From inquiries made at the Castle I believe them to have been the European Eagle-Owl, *Bubo maximus*, but on this head see Borrer's 'Birds of Sussex,' p. xvii. With what degree of precision their ages were recorded it is difficult to say; but the present Duke confirmed the fact of their being very old, and concerning Mr. Meade-Waldo's pair there need be no question.

ACCIPITRES.

Besides the 27 cases to be presently enumerated, several of which it will be seen from the list are sufficiently remarkable, there are stories with much credibility about them of still older *Accipitres*, and to these I would briefly direct

attention. To begin with, Brehm, in his 'Life of Animals' (1878), gives us an *Aquila chrysaetus* nearly 80, which had died in captivity at Schoenbrunn. At this place also a white-headed Vulture died in 1824, at the age of 118 (Knauer, 'Der Naturhistoriker').

According to Maitland's 'History of London' (1756), there was in 1754, in the 'Tower of London menagerie, "a Golden Eagle which has been kept there upwards of ninety years, and several other Eagles."

The 'Berlin Post' (as quoted by the 'Times' of Sept. 8, 1883, reprinted Zool. vii. p. 422) relates a story of an Imperial Eagle (qu. *A. imperialis* or *A. adalberti*?) taken that year in Brandenburg ringed with a plate on which was engraved "H. Ks. O. K.," and underneath "Eperjes," and on the other side "10. 9. 1827," which makes the bird 56 years old. Eperjes is in Upper Hungary, and in the opinion of Dr. J. von Madarász the first two letters stand for the owner's name.

Long ago there was at Vienna a reputed Eagle of 104, which has done duty in many books without reference to the original passage recording it. It will be found in John G. Keysler's 'Travels through Germany' (i. p. 70), where the Eagle is affirmed to have lived in confinement from 1615 to 1719. Keysler's work was first published in German, and the history of this Eagle seems to have been told him at Munich in 1829.

According to an extract from the 'Naturalien Cabinet' of Oct. 5, 1897, kindly sent me by Dr. P. Leverkühn, a Royal or Golden Eagle had been recently shot at Eszeg, in Slavonia, with a steel ring round its neck engraved with the arms and name of a Slavonian family, and above them the date 1646. The story was copied into some of the English newspapers, but Mr. Tschusi, the editor, has informed Dr. Leverkühn that he discredits it, and it seems incredible.

In the 'Gentleman's Magazine' for 1793, p. 181, it is related how a Hawk, probably *Falco peregrinus*, had been found at the Cape of Good Hope and brought from thence by one of the India ships, having on its neck a gold collar

thus engraved:—"This goodlie Hawk doth belong to his Most Excellent Majestie James, Kinge of England. A.D. 1610." The anecdote is barely credible, for a Hawk with a ring round its neck—a primitive method (Norw. N. Tr. iii. p. 88)—is not very likely to have lived 180 years or to have flown 6500 miles. Another Falcon is said to have attained 162 (Knauer, 'Der Naturhistoriker').

PELECANIDÆ.

Willughby, on the authority of Schaad, tells his readers of a Pelican of 40 in the Duke of Bavaria's court, while Aldrovandus tells of another at Mechlin, in Brabant, known to be 50, and believed to be 80 ('Ornithologia,' xix. p. 22). Turner also tells of one of 50, perhaps the same (Hist. Avium). Pelicans have been known to live a long time in various zoological gardens, even where they have had no sheet of water to sail about on. We learn, for instance, that "of a great number of Pelicans kept in the menagerie at Versailles none died in the space of 12 years" (Mém. de l'Acad. des Sci.), a record which *Pelecanus onocrotalus*, *P. conspicillatus*, and *P. crispus*, the property of the Zoological Society, can easily beat, under the guardianship of their watchful keeper, T. Church.

At Rotterdam there is a Pelican of 41 still living.

But enough has been said to show the considerable duration of life of the *Pelecanidæ* under the most favoured circumstances.

ARDEIDÆ.

Hérons have been often ringed by hawking clubs and afterwards retaken, affording well-attested cases of longevity in a wild state and of migratory wanderings as well (*cf.* 'Birds of Norfolk,' ii. p. 139; 'Birds of Suffolk,' p. 158). It will be sufficient to give the particulars of the two oldest only. In the 'Annual Register' for 1767, under date July 7th, readers are informed that "As the Prince Stadtholder [of Holland] was taking the diversion of hawking, he caught a Heron with a brass inscription round its legs, setting forth

that it had been taken and released by the Elector of Cologne in the year 1737," *i. e.* a Heron of 30 years of age. But nine years before that, *viz.*, in the spring of 1728, a Heron was taken in Bavaria which had been ringed 60 years before by Duke Ferdinand the Elector, according to Keysler's 'Travels through Germany,' i. p. 70. As Keysler says he was at Starrenberg Palace the year following, it was no doubt there that he got the particulars first-hand. The Crane has lived to be 40, and my father has recorded a Black Stork of 30.

ANSERES.

Tame Geese are long-lived (see p. 24) and easy to verify, and by inference wild Geese would be long-lived. Two centuries ago Francis Willughby had the story of a domestic Goose which was 80, and was then killed for its destructiveness though yet sound and lusty, from a friend who is spoken of in two places as "of very good credit" and "undoubted fidelity" ('Ornithology,' pp. 14, 358). There is really no reason whatever to question it, especially as Buffon considers that a Goose once reached 100, and Pennant was equally aware of what he terms a vast longevity. There was once a Goose at the Saracen's Head Inn at Paisley, in Renfrew, N.B., computed to be nearly 100 (R. Lee).

Mute Swans have for centuries had the credit of turning into 'Methuselahs,' even to the extent of 300 years (Aldrovandus), and Norfolk waters have produced some supposed patriarchs, one of which is in Norwich Museum. Naumann alludes to Swans from 50 to 100 years old, and Broderip, in his 'Zoological Recreations,' after citing a Swan at Sheperton supposed to be over 100, and another of 50, quotes from the 'Morning Post' the following:—"The beginning of last week [July 1840] an exceedingly well-known character departed this life, namely Old Jack, the gigantic and venerable Swan with which the public have been so long acquainted on the canal in the enclosure of St. James's Park, at the advanced age of 70 years. Old Jack was hatched some time about the year 1770 on the piece of water attached to Buckingham House."

It is on record that a [Mute] Swan died at Alkmaar, a town near Amsterdam, in 1675, which bore a metal collar on which was inscribed the date "1573," indicating a life of 102 years. After considerable search to verify this story, it has been satisfactorily traced by Mr. F. E. Blaauw and Mr. Bruinvis to the original record in the 'Chronyk van Nedenblik door Dirk Burger van Schoorl' (1762).

At the celebrated Swannery at Abbotsbury, in Dorsetshire, the Mute Swans have the reputation of being capable of living 150 years, but it does not appear that any attempt has been made to 'ring' them. *Cygnus atratus* and *C. buccinator* have been kept to 18, and *C. musicus* to 12 years. The oldest Duck I shall have to quote was only 29, but Icelanders have asserted that Eider Ducks have been known to live 100 years (Olafsen and Povelsen).

DIOMEDEIDÆ.

I am indebted to Mr. H. Grönvold for news of an Albatross of about 46, on the authority of a Japanese newspaper called the 'Hiogo News,' and for a translation of the narrative of its capture. The Albatross was taken by the ship 'Duchess of Argyll,' Capt. Hoard, near Cape Horn, with a compass-case attached to its neck, containing the information that it had been previously caught in the middle of the North Atlantic by an American vessel, the 'Columbus,' on May 8, 1840. A new case was affixed, and it was again dated and released, in January or February, 1887. As has been already mentioned, an Albatross has the power of going a very long time without food, which gives it an advantage in the race for life.

The kind assistance of Dr. J. Büttikofer, Mr. E. Meade-Waldo, Mr. H. Grönvold, and Dr. A. G. Butler has been rendered to enable me to compile the following List of 75 species, and I am especially indebted to Dr. Paul Leverkühm, of Sofia, Mr. F. E. Blaauw, of Hilversum, C.M.Z.S., and Prof. Newton for their help. Where the words "still alive" are added, they mean living at the age here given. The sex

has been added wherever obtainable, because Brehm thinks there are more male birds than females, and it may be that Nature, to compensate the balance, gives longer life to the female. The three oldest birds of which the sex is known were females, viz. :—♀, *Anser domesticus*, of 80; ♀, *Bubo maximus*, of 68; ♀, *Coracopsis vasa*, of 54.

Name of Species.	Number of years old.	Authority.
Song-Thrush	17	A. G. Butler, F.Z.S.
<i>Turdus musicus.</i>	15	Mr. Bilham, Cromer.
Blackbird	20½	Thompson's 'Birds of Ireland,'
<i>Turdus merula.</i>	still alive.	i. p. 148.
" "	♂ 20	Ditto, i. p. 147.
Blue Thrush	24	H. A. Macpherson, <i>ex</i>
<i>Monticola cyaneus.</i>		'Avicula,' 1897, p. 147.
Nightingale	25	Dr. Bechstein's 'Cage-birds,'
<i>Daulias luscinia.</i>		p. 363.
" "	15	Ditto ditto.
" "	10	'Zoologist,' 1865, p. 9725.
House-Martin	9	'Zoologist,' 1876, p. 4957.
<i>Chelidon urbica.</i>		
White-headed Manikin . . .	♀ 18	A. G. Butler, F.Z.S.
<i>Munia maja.</i>	♂ 17	Ditto.
Goldfinch	23	C. Gesner, Hist. Av. (1555).
<i>Carduelis elegans.</i>	17	'Birds of Ireland,' iii. p. 467.
Canary	20	Zool. 1886, p. 478.
<i>Serinus canarius.</i>	18	J. Mackley, Norwich.
" "	17	'The Field,' June 8, 1867.
Brown Linnet	♂ 17	Zool. 1886, p. 478.
<i>Linota cannabina.</i>	14	G. Thirkettle.
Bullfinch	19	'Birds of Ireland,' iii. p. 467.
<i>Pyrrhula europæa.</i>	9	G. Thirkettle.
Cardinal Grosbeak	21	Wilson, Am. Ornith. ii. p. 275.
<i>Cardinalis virginianus.</i>	14	Fox, Newcastle Mus. p. 153.
Great Bird of Paradise . . .	♂ 15	P. Z. S. 1840, p. 13.
<i>Paradisea apoda.</i>		
Raven	69	Dresser's 'Birds of Europe,' iv.
<i>Corvus corax,</i>		p. 569.

Name of Species.	Number of years old.	Authority.
Raven	50	Zool. 1882, p. 45.
<i>Corvus corax.</i>	24	Dr. J. Büttikofer.
Piping Crow	28	Rotterdam Zool. Gardens,
<i>Gymnorhina tibicen.</i>		J. Büttikofer.
” ”	♂ 26	‘The Field,’ Nov. 12, 1898.
Magpie	21	Zool. 1850, p. 2824.
<i>Pica rustica.</i>		
Chough	17	Zool. 1876, p. 4924.
<i>Pyrrhocorax graculus.</i>	16	Ditto.
Skylark	24	Raczynski, Hist. Nat. Poloniæ,
<i>Alauda arvensis.</i>		1745.
” ”	20	Zool. 1865, p. 9604.
Laughing Kingfisher	11	Rotterdam Zool. Gardens,
<i>Dacelo gigantea.</i>		J. Büttikofer.
Australian Nightjar	8½	‘The Field,’ June 19, 1869.
<i>Podargus cuvieri.</i>		
Bare-eyed Cockatoo	32	London Zool. Gardens.
<i>Cacatua gymnopsis.</i>	♀ 15	F. E. Blaauw, C.M.Z.S.
Sulphur-crested Cockatoo	81?	‘Birds of Ireland,’ iii. p. 467.
<i>Cacatua galerita.</i>	80	‘The Field,’ Nov. 12, 1898.
” ”	50	L. Travis, Bury.
” ”	45	‘The Field,’ Nov. 12, 1898.
Grey Parrot	50	E. T. Roberts, Norwich.
<i>Psittacus erithacus.</i>	40	Rowley, Orn. Misc. i. p. 172.
Greater Vasa Parrot	♀ 54	P. Z. S. 1884, p. 562, P. L.
<i>Coracopsis vasa.</i>		Sclater.
Amazon Parrot	30	In Norwich Museum (<i>Cubitt</i>).
<i>Chrysotis amazonica.</i>	24	A. G. Butler, F.Z.S.
Blue Macaw	64	‘Revue et Magasin de Zool.’
<i>Ara macao.</i>		1864, p. 409.
” ”	♀ 21	‘The Field,’ March 3, 1894.
” ”	17	J. Büttikofer.
Eagle-Owl	♀ 68	E. Meade-Waldo, F.Z.S.
<i>Bubo maximus.</i>	still alive.	
” ”	♂ 53	Ditto.
” ”	♀ 34	‘Birds of Norfolk,’ i. p. 47.
” ”	28	The late W. E. Beckwith.

Name of Species.	Number of years old.	Authority.
Ceylonese Fish-Owl <i>Ketupa ceylonensis.</i>	39	Amsterdam Zool. Gardens, F. E. Blaauw.
Tawny Owl <i>Syrnium aluco.</i>	♂ 26	In the Norwich Museum.
" "	21	'The Naturalist,' 1897, p. 131, and 1898, p. 269.
" "	18	Mason's 'Hist. of Norfolk,' App.
Condor <i>Sarcorhamphus gryphus.</i>	52	Amsterdam Zool. Gardens, F. E. Blaauw.
" "	still alive.	
" "	9½	'Auk,' 1885, p. 171.
Griffon Vulture <i>Gyps fulvus.</i>	♀ 34	London Zool. Gardens ('Zoo-logist,' 1861, p. 7543).
Sociable Vulture <i>Otogyps auricularis.</i>	♀ 24	J. H. Gurney, sen., 'Ibis,' 1877, p. 257.
" "	12	J. Büttikofer.
Cinereous Vulture <i>Vultur monachus.</i>	32	Amsterdam Zool. Gardens, F. E. Blaauw (<i>cf.</i> Norwich Nat. Tr. iv. p. 573).
Sea-Eagle <i>Haliaëtus albicilla.</i>	♀ 42	Lord Lilford, Norwich Nat. Tr. iv. p. 564.
" "	36	J. H. Gurney, sen.
Imperial Eagle <i>Aquila imperialis.</i>	56	J. G. Keysler's 'Travels,' i. p. 70.
Spanish Imperial Eagle <i>Aquila adalberti.</i>	27	Lord Lilford (<i>cf.</i> Norwich Nat. Tr. iv. p. 566).
" "	26	J. H. Gurney.
" "	still alive.	
Golden Eagle <i>Aquila chrysaëtus.</i>	46	'The Field,' May 11th, 1867.
" "	41	Pennant, Brit. Zool. i. p. 165.
" "	28	J. H. Gurney, sen.
Bateleur Eagle <i>Helotarsus ecaudatus.</i>	55	Amsterdam Zool. Gardens, F. E. Blaauw.
" "	still alive.	
" "	20	J. H. Gurney, sen.
Buzzard <i>Buteo vulgaris.</i>	23	Zool. 1876, p. 4829.
" "	21	Lord Lilford.
South-American Caracara <i>Polyborus tharus.</i>	35	London Zool. Gardens, Edward Blyth.
Red Kite <i>Milvus iclinus.</i>	♀ 33	Zool. 1865, p. 9686.
" "	♀ 21	Ditto.
" "	♀ 27	J. H. Gurney, sen.

Name of Species.	Number of years old.	Authority.
Yellow-billed Kite <i>Milvus egyptius.</i>	♀ 28 13 still alive.	J. H. Gurney, sen. J. Büttikofer.
White Pelican <i>Pelecanus onocrotalus.</i>	41 still alive.	Rotterdam Zool. Gardens, J. Büttikofer.
" "	40	Willughby's 'Ornithology,' p. 328.
" "	23	London Zool. Gardens.
Crested Pelican <i>Pelecanus crispus.</i>	29 still alive.	London Zool. Gardens.
" "	27	Rotterdam Zool. Gardens.
" "	18	Ditto.
Cormorant <i>Phalacrocorax carbo.</i>	23	'British Birds,' by H. O. Forbes and others, iii. p. 167; 'The Field,' May 27, 1882.
American Darter <i>Plotus anhinga.</i>	12	Rotterdam Zool. Gardens, J. Büttikofer.
Green-backed Porphyrio . . <i>Porphyrio smaragdonotus.</i>	19 14	'Ibis,' 1889, p. 398. Ditto.
White-necked Crane <i>Anthropoides leucauchen.</i>	28	Amsterdam Zool. Gardens, F. E. Blaauw.
Common Crane <i>Grus communis.</i>	40	London Zool. Gardens, T. Church [<i>cf.</i> 'Field,' Jan. 2, 1875].
Heron <i>Ardea cinerea.</i>	60 30	Keysler's 'Travels,' i. p. 70. 'Annual Register,' July 7th, 1767.
" "	22	J. Büttikofer.
Black Stork <i>Ciconia nigra.</i>	30	J. H. Gurney, sen., in Dresser's 'B. of Europe,' vi. p. 316.
American Jabiru <i>Mycteria americana.</i>	36	Amsterdam Zool. Gardens, F. E. Blaauw.
Sacred Ibis <i>Ibis aethiopica.</i>	20 still alive.	London Zool. Gardens, T. Church.
" "	11	J. Büttikofer.
Boatbill <i>Cancroma cochlearia.</i>	18 still alive.	Rotterdam Zool. Gardens, J. Büttikofer.

Name of Species.	Number of years old.	Authority.
Domestic Goose	♀ 80	Willughby's 'Ornithology.'
<i>Anser cinereus</i> , var.	45	'Birds of Ireland,' iii. p. 467.
" "	35	'City Press,' no date.
" "	♀ 31	'Domestic Poultry,' p. 152.
Cereopsis Goose	33	Rotterdam Zool. Gardens,
<i>Cereopsis novæ-hollandiæ</i> .		J. Büttikofer.
Bernacle Goose	32	Yarrell, B. B. 4th ed. iv. p. 228.
<i>Bernicla leucopsis</i> .		
Mute Swan	70	'Zoological Recreations,' by
<i>Cygnus olor</i> .		W. J. Broderip, p. 164.
Nyroca Duck	♂ 15	J. H. Gurney, sen.
<i>Fuligula nyroca</i> .	13	J. Büttikofer.
" "	11	Ditto.
Pochard	♀ 20	E. Meade-Waldo.
<i>Fuligula ferina</i> .	still alive.	
" "	♀ 17	Zool. 1893, p. 148.
" "	♂ 13	J. H. Gurney, sen.
Wigeon	♂ 23	E. Meade-Waldo.
<i>Mareca penelope</i> .	22	'The Field,' May 25th, 1867.
" "	18	Ditto ditto.
Wild Duck	♂ 29?	'Birds of Norfolk,' iii. p. 170.
<i>Anas boscas</i> .	22	J. H. G., Zool. 1875, p. 4541.
" "	♀ 16	J. Hancock.
Collared Dove	♂ 40	F. E. Blaauw.
<i>Turtur risorius</i> .	♀ 35	Ditto.
" "	♂ 33	'The Field,' Dec. 12th, 1896.
" "	30	Ditto ditto.
Tame Pigeon	♂ 28½	'The Field,' Feb. 9th, 1895.
<i>Columba livia</i> , var.		[Cf. Macgillivray, B. B. i. p. 279.]
Silver Pheasant	♂ 21	'Birds of Ireland,' p. 27.
<i>Euplocamus nycthemerus</i> .		
Domestic Fowl	♂ 30	'The Newcastle Museum,' by
<i>Gallus domesticus</i> .		G. T. Fox, p. 147.
" "	♂ 25	Proc. Wernerian N. H. Soc. iii. p. 206.
" "	24	Daniel's 'Rural Sports,' iii. p. 21.

Name of Species.	Number of years old.	Authority.
Temminck's Tragopan <i>Ceriornis temmincki.</i>	♂ 14	F. E. Blaauw.
Oyster-catcher <i>Hæmatopus ostralegus.</i>	30	Zool. 1846, p. 1501.
Ruff <i>Machetes pugnax.</i>	10	London Zool. Gardens, J. Waterman.
Lesser Black-backed Gull. . . <i>Larus fuscus.</i>	♂ 31	Hancock's 'B. of Northumberland,' p. 139.
" "	30	Ditto. ditto.
" "	♂ 22 still alive.	Zool. 1865, p. 9402.
Herring-Gull <i>Larus argentatus.</i>	44	'Science Gossip,' 1876, p. 238.
	21	Sharp's 'Hist. of Hartlepool,' App.
Great Skua <i>Stercorarius catarrhactes?</i>	24	Yarrell, 'Brit. B.' 4th ed. iii. p. 667.
Albatross <i>Diomedea exulans.</i>	46	C. Rosenberg, Mitt. des orn. Ver. in Wien, 24 Mar. 1887, per H. Grönvold.
Apteryx <i>Apteryx australis.</i>	♀ 20	London Zool. Gardens, C. Bartlett.
Westermann's Cassowary. . . <i>Casuarus westermanni.</i>	26 still alive.	Rotterdam Zool. Gardens, J. Büttikofer.
Emu <i>Dromæus novæ-hollandiæ.</i>	28	Rotterdam Zool. Gardens, J. Büttikofer.
" "	22	Ditto ditto.
" "	20	Ditto ditto.
		[Cf. Norwich Nat. Tr. vi. p. 350.]

It will be seen how many families are unrepresented in the preceding list; for example, there are no *Laniidæ*, *Loxiadæ*, *Motacillidæ*, *Sylviinæ*, *Sturnidæ*, *Oriolidæ*, *Paridæ*, *Picidæ*, or *Capitonidæ*, and no marine or diving-birds such as *Podicipedidæ*, *Alcidæ*, *Colymbidæ*, *Procellariidæ*, and *Sterninæ*. Neither are there any *Otididæ*, though Goldsmith says that Great Bustards usually live 15 years, probably

quoting somebody; and it might have been expected that someone would have put forward cases of longevity among the *Tetraonidæ*.

To draw any comparison between birds and mammals is not very easy. Birds attain their growth of stature much quicker than most of the Mammalia, and there seems good reason for thinking they can live as long; but some writers, including Edward Blyth, have held that they cannot. It has been said that in a general way the age of beasts is equal to six times the period which they take to grow to full growth of stature, and there may be truth in this axiom, but it cannot apply to birds. It seems to be quite clearly proved that some tame elephants have reached one hundred years ('The Field,' March 11th, 1871, and January 29th, 1898), and evidence points to the probability of their having reached two hundred in a wild state. Horses have not much chance of running to the length of their tether, but a barge-horse was sixty-one (*IV. Youatt*), a Galloway pony at Stilworthy was 60, and a Shetland pony was 42. A Pomeranian dog was 19 (*Zool.* 1878, p. 100), and another dog 22 (*Youatt*), while Mr. A. Patterson, of Yarmouth, had a cat which was 18 years old. In the London Zoological Gardens, according to Mr. Cornish, an Indian rhinoceros attained to 37, and a Polar bear to 34; while a relative of Dr. Paul Leverkühn's shot a deer which for 40 years had carried a little metal box with the date "April 1829" inside it, proving its age.

It is beyond question that fishes, such as, for example, pike and carp, can attain to a very great age, and so can tortoises. The Hon. Walter Rothschild deposited in the Zoological Gardens a *Testudo daudini* 150 years old; and Gilbert White's *T. marginata* was 54; but one in Norfolk was asserted to be 100 (*Norwich Nat. Tr.* ii. pp. 164, 174). In the Natural History Museum there is an oil-painting of a pike which was 267 years old. The reptile-house at the Zoological Gardens is stated to contain a Mississippi alligator of 20, and until lately a Reticulated Python of the same age.

Prof. Newton, to whose assistance I am in many ways indebted, has drawn attention to Dr. Weismann's 'Essays on Heredity,' particularly one on the duration of animal life, where the uniformity with which birds maintain their numbers, which I have before referred to, is dwelt upon, and several other questions bearing on the age of birds. Dr. Weismann is of opinion that all birds and mammals outlive the period of reproduction, but in the case of birds the facts I have collected rather show the contrary. He also thinks that only in the largest mammalia—whales and elephants—is the duration of life equal to the longest-lived birds, but on this head we require more facts.

So far as birds are concerned, the points on which further information is wanted are principally:—

1. Are birds of some families longer-lived than those of others?
2. Do female birds live longer than males?
3. Are birds which are long in their incubation therefore long-lived?
4. Do large birds live longer than small ones?
5. Do birds in general live as long as mammals?
6. Do birds which lay only one egg live longer than birds which lay ten?

Reference may also be made to Prof. Ray Lankester's work on the 'Comparative Longevity in Man and the Lower Animals.'

V.—*An Epitome of Dr. Walter's Ornithological Results of a Voyage to East Spitsbergen, in the Year 1889* *. By WILLIAM EAGLE CLARKE, F.L.S.

THIS valuable paper on the birds observed by the Expedition to East Spitsbergen promoted by the Bremen

* "Ornithologische Ergebnisse der von der Bremer geographischen Gesellschaft im Jahre 1889 veranstalteten Reise nach Ostspitzbergen. Von Dr. Alfred Walter. (Aus dessen hinterlassenen Notizen bearbeitet von Prof. Dr. Willy Kükenenthal.)" *Journal für Ornithologie*, xxxviii. Jahrg. No. 190, pp. 233-255 (April 1890).